

SYLLABUS

1. Course title:

Intelligent Systems in Electrical Power Engineering

2. Code:

EEMS007

3. Cycle of study:

1

4. ECTS credits:

6

5. Type of course: Mandatory Elective**6. Prerequisites:****7. Class restrictions:**

Students from the Faculty of Electrical Engineering, study program Electrical Engineering and Computer Science that

8. Duration / semester:

1

5

9. Weekly contact hours:

9.1. Lectures:

3

9.2. Seminars:

1

9.3. Laboratory/Practice classes:

1

10. Faculty:

Faculty of Electrical Engineering

11. Department/study program:

Electrical Engineering and Computer Science

12. Lecturer:

Ph.D. Tatjana Konjic, assoc. prof.

13. Lecturer's e-mail:

tatjana.konjic@untz.ba

14. Web site:

(max. 50 characters)

15. Course aims:

Course goal is to develop students' interest in and understanding of the modern methods based on artificial intelligence as well as their application to the electrical power engineering.

16. Learning outcomes:

At the end of the course students that continuously perform their duties throughout the teaching period will be able to:

- identify basic components of artificial intelligence
- explain basic concept of neural networks, fuzzy systems and evolutionary algorithms
- form simple model of feedforward neural networks, fuzzy systems and genetic algorithm
- identify main parameters of neural networks, fuzzy systems and genetic algorithm
- identify possible application of these systems in power engineering
- use Matlab for above mentioned system development.

17. Course content:

1. Introduction to artificial intelligent systems: components and historical development
2. Artificial neural network (nn): neuron, perceptron, types of nn, learning procedures.
3. Basic of fuzzy set theory and fuzzy logic.
4. Fuzzy Inference Systems: Mamdani and Takagi-Sugeno.
5. Evolutionary algorithm: division, basic characteristics.
7. Genetic algorithm.
8. Using Matlab in area of the artificial intelligent systems.
9. Application of the above mentioned methods to simple examples from electrical power engineering.

18. Learning methods:

- Direct lectures
- Numerical exercises
- Laboratory practice
- Preparation and oral presentation of seminar work
- Consultation

19. Assessment methods:

- The exam is written and oral. Tests (3) are written exams that are combination of theoretical questions and numerical problems discussed during lectures and numerical hours. Tests are three times during semester. The final exam is oral exam that includes presentation of the seminar work and theoretical questions. Students are able to correct Tests and final exam during correctional final exams.
- The student is obliged to submit reports of laboratory exercises and homework in continuity during semester and to discuss it with assistant.
- During semester students will have three tests that includes numerical problems and theoretical questions that were presented during lectures and practice hours. Test 1 will be hold in VI or VII week of the semester, Test 2 will be hold in XII week while Test3 in XV week of V semester. Exact time and place of Tests will be featured ten (10) days before the Tests.
- After the end of the Course students who get signature from the professor are able to access the final exams.
- At the final exam students can correct tests and present seminar work.
- To form the final grade students are obliged to collect min 50% points at each tests, and min 60% at homework and seminar work each.
- During correctional final exams students are able to correct tests.
- Final exam and correctional final exams are organized according the calendar of final exams adopted by Senate of The University of Tuzla at the beginning of schooling year.

20. Assessment components:

Final number of points is formed by cumulative collections of points for lecture attendance (5 points) + homework (18 points) + tests (test 1 (25 points) + test2 (26 points)+ test3 (20 points)) and final exam-seminar work (6 points).
Total number of points is $5+18+25+26+20+6=100$.

21. Required reading list:

1. Notes and slides prepared by professor
T. Konjić, Odlučivanje i optimizacija, Repro Karić, Tuzla, 2010.
T. Ross, Fuzzy Logic with Engineering Applications, John Wiley & Sons, 2004.
MATLAB - Fuzzy Toolbox, Simulink, Neural Network Toolbox.
K. Tomsovic, M.Y. Chow, Tutorial on Fuzzy Logic Application in Power Systems, IEEE-PES Winter Meeting in Singapore, January 2000

22. Web sources:

(max. 687 characters)

23. Applicable starting from the academic year:

2016/17

24. Adopted in the Faculty/Academy session:

04.04.2016.